Topic 13 – Emergencies and intensive care in cardiology

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Sensitivity and specificity of post-resuscitation ECG for the diagnosis of acute myocardial infarction in out-of-hospital cardiac arrests

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Coronary angioplasty can decrease mortality in patients with acute myocardial infarction (AMI) and out-of-hospital cardiac arrest (OHCA). Sensitivity (Se) and specificity (Sp) of electrocardiogram (ECG) for AMI diagnosis in these patients are debated.

Purpose: to determine the Se and Sp of immediate post-resuscitation ECG for AMI diagnosis in patients resuscitated from an OHCA.

Methods: We screened in a prospective single centre study, 210 consecutive patients admitted for OHCA regardless of ECG abnormalities and medical history, between January 2002 and June 2008. All patients underwent coronary angiogram with angioplasty on arrival at the hospital. Exclusion criteria were: obvious non-cardiac cause of OHCA, age <18 or >90 years, unstable or absence of return of spontaneous circulation. AMI was characterized at angiography by a significant stenosis (>80% lumen diameter) and TIMI 3 or 2 flow with intracoronary fresh thrombus, or TIMI 1 or 0 flow due to an occlusion easily crossed by a guide wire. Results are expressed as mean ± SD [range].

Results: Among the 170 patients included, 77% were male and mean age was 58 ± 13 [26-90]. On post-resuscitation ECG, 41% presented with ST segment elevation, 15% with ST depression only (≥1mm), 12% with large QRS complex only (>120 ms with left bundle branch block or atypical morphology), and 32% with no significant ECG changes. AMI was diagnosed in 38% of the patients: in 76% of the patients with ST segment elevation, in 15% with ST depression, in 15% with large QRS, and in 0% with none of the above. Se and Sp for AMI diagnosis of ST elevation, ST elevation or depression and ST elevation or depression or large QRS were 88% and 83%, 95% and 63%, 100% and 46% respectively.

Conclusion: ST elevation on ECG after a resuscitated OHCA has a moderate Se and Sp for AMI diagnosis. The combined criterion of ST elevation or depression or large QRS has 100% sensitivity in our study and could identify all patients with AMI in the setting of OHCA.

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Outcome after immediate invasive strategy in out-of-hospital cardiac arrest

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Background: According to the most recent guidelines, patients resuscitated from a cardiac arrest due to an acute coronary syndrome (ACS) should undergo an immediate coronary angiography with a subsequent percutaneous coronary intervention (PCI) if indicated. However, the outcome of this strategy and the value of the ECG in this setting are controversial. The aim of our study is to describe the results of such a strategy and to analyze the value of the ECG in a large cohort of patients resuscitated from an out-of-hospital cardiac arrest (OHCA).

Methods: A coronary angiogram was performed in all survivors of an OHCA referred to a tertiary center if there was no obvious non-cardiac cause of arrest. ECG changes noted on the electrocardiogram recorded after the return of spontaneous circulation were classified in 3 patterns (Group 1: ST segment elevation, Group 2: ST segment depression, conduction anomalies or negative T waves, Group 3: non-specific changes or normal).

Results: 669 OHCA patients were admitted between January 2003 and August 2008. A coronary angiogram was performed in 372 (56%) ST segment elevation was noted in 112 patients (30%), ST depression or negative T waves in 183 (49%) and non-specific changes or normal ECG in 77 (21%). PCI was performed in 156 patients (42%). PCI was more frequently performed in patients with ST elevation (90/112, 80%) than in the other groups (Group 2: 52/183, 28% Group 3: 14/77, 18%, p<0.0001). Overall 153/372 patients (41%) survived during their hospital stay. The survival rates were respectively of 57/112 patients (51%) in Group 1, 75/183 patients (41%) in Group 2 and 21/77 patients (27%) in Group 3 (p<0.005).

Conclusions: Our results suggest that an immediate coronary angiography with subsequent PCI is associated with a low mortality rate, particularly in patients with ST segment elevation. Further analyses will investigate the exact impact of such a strategy in all subsets of OHCA patients.

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Extra Corporeal Life Support: A hope in refractory cardiac cardiac arrest?

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Background: Extracorporeal life support (ECLS) using the percutaneous femoral approach has been proposed as a resuscitative tool in patients (pts) with refractory cardiac arrest (CA) or refractory cardiogenic shock. Little is known however about medium term outcome in this setting.

Purpose: Accordingly, we aimed to analyse the feasibility, complications, short- and medium-term outcome of emergency ECLS implanted during or after CA.

Method: Retrospective analysis of in-hospital data and prospective follow-up of 50 consecutive patients (pts) successfully implanted with ECLS between 2005-2007.

Results: CA was secondary to ST+ acute coronary syndrome, non ischemic heart disease, poisoning, and pulmonary embolism in 27 (54%), 17 (34%), 4 (8%), and 2 pts (4%) respectively (33 males, mean age 47±14 years). Mean delay between CA and ECLS was 48±50 min. Percutaneous femoral implantation of ECLS was attempted in 56 pts, and was successful in 50 (feasibility 89%): In- and out of- hospital CA occurred in 43 and 7 pts respectively. 40 pts had recovered spontaneous circulation at the time of ECLS implantation but had persistent cardiogenic shock, while 10 pts were still under cardiopulmonary resuscitation. Mean duration of ECLS was 38±48 hours. 38 patients died in ICU, mainly from multiple organ failure or brain death. Twelve patients (24%) were explanted and 10 patients (20%) were discharge from hospital after a median stay of 29 days. All discharged patients were alive at a median follow-up of 16.8 months. None had neurological disability, one underwent heart transplantation, and all were in NYHA class I or II.

Conlusion: In our initial experience, 20% of the treated patients were discharged, and were alive at 16 months with a good quality of life. Results of the following patients who have benefited from ECLS after these 50 initial patients will be also presented. ECLS should therefore be considered in selected pts with persistent hemodynamics failure after CA.

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Causes and hospital mortality in a large cohort of out-of-hospital cardiac arrest

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